

Singapore Plant A - Odour Generating Activity	No of Chickens	Floor Area* m ²	Head Room* m	Volume m ³	Measured Odour	Estimated Odour
					Concentration (Arithmetic Mean) ou/m ³	Emission per Chicken (OU/Chicken)
Holding Area	3,000	40	4.5	180	396.7	23.8
Slaughtering Area	4,000	50	4	200	518.5	25.9
Evisceration Area	4,000	44	4	176	536.5	23.7
Packing	4,000	44	4	176	51.0	2.2

Notes:

*Estimated based on site observations.

Singapore Plant B - Odour Generating Activity	No of Chickens	Floor Area* m ²	Head Room* m	Volume m ³	Measured Odour	Estimated Odour
					Concentration (Arithmetic Mean) ou/m ³	Emission per Chicken (OU/Chicken)
Holding Area	17,000	80	7	560	481.0	15.8
Slaughtering Area	4,000	32	7	224	540.5	30.3
Evisceration Area	4,000	49	7	343	730.0	62.6
Packing	4,000	49	7	343	44.0	3.8

Notes:

*Estimated based on site observations.

Area No.	PSC Stall 1 - Odour Generating Activity	No of chickens	Floor Area m ²	Head Room m	Volume m ³	Normalised Odour	From Singapore PlantA or B
						Concentration ou/m ³	
1	Reception/Holding Area	12,675	222	3.5	777	388.2	A
2	Slaughtering Area (bleeding, killing, scalding, de-feathering)	1,450	201	3.5	704	187.2	B
3	Evisceration Area	1,450	253	3.5	886	307.5	B
4	Packing Area	1,450	276	3.5	966	5.7	B
5	Waste Collection Area	N/A	42	3.5	146	604.0	A
6	WTF	N/A	191	4.5	860	100.0	Sheung Shui Slaughtering Plant

Area No.	PSC Stall 2 - Odour Generating Activity	No of chickens	Floor Area m ²	Head Room m	Volume m ³	Normalised Odour	From Singapore PlantA or B
						Concentration ou/m ³	
1	Reception/Holding Area	12,675	224	3.5	784	384.8	A
2	Slaughtering Area (bleeding, killing, scalding, de-feathering)	1,450	220	3.5	770	171.0	B
3	Evisceration Area	1,450	250	3.5	875	311.2	B
4	Packing Area	1,450	272	3.5	952	5.7	B
5	Waste Collection Area	N/A	40	3.5	140	604.0	A
6	WTF	N/A	141	4.5	635	100.0	Sheung Shui Slaughtering Plant

Remarks:

Normalised odour concentration = max of estimated odour emission per chicken (OU/chicken) of Plants A or B X no. of chickens / room volume (Areas 1 to 4 apply).

Normalised odour concentration at Area 5 (Waste Collection Area) is the odour concentration measured at Plant A.

Normalised odour concentration at Area 6 (WTF) is the odour concentration measured at Sheung Shui Slaughtering Plant.

Calculations of Emission for the Exhaust Outlet at Poultry Slaughtering Centre (PSC) Stall 1

Area No.	PSC - Odour Generating Activity	Floor area m ²	Clear Head room m	Volume m ³	Air Exchange Rate per hour	Airflow Rate m ³ /s	Worst-case Measured Odour Concentration ou/m ³	Adjusted Odour Emission Rate ou/m ³	Odour Emission Rate ou/s	Average Odour Emission Rate after Scrubber Unit ou/s
1	Reception/Holding Area	222	3.5	777	12	2.6	396.7	388.2	1,005.6	50.3
2	Slaughtering Area	201	3.5	704	10	2.0	540.5	187.2	365.7	18.3
3	Evisceration Area	253	3.5	886	8	2.0	730.0	307.5	605.1	30.3
4	Packing Area	276	3.5	966	5	1.3	44.0	5.7	7.6	0.4
5	Waste Collection Area	42	3.5	146	15	0.6	604.0	604.0	366.6	18.3
						Total Airflow Rate, m ³ /s	4.2	Total Odour Emission	2,350.6	117.5
						Number of Exhaust Outlet	1	Odour Removal Efficiency of Scrubber Unit 95%		
						Airflow Rate of each Outlet, m ³ /s	4.2			
						Airflow Rate of each Outlet, m ³ /hr	15,109.3			
						Efflux velocity, m/s	15.9			
						Area of each Outlet, m ²	0.26			
						Radius of Exhaust Outlet, m	0.29			
						Diameter of Exhaust Outlet, m	0.58			

Notes

1. Required airflow rates of Areas 2 to 4 are calculated based on a fresh air rate of 10 L/person/second.
2. Actual fresh air intakes are calculated based on the required fresh air take.

Calculations of Emission for the Exhaust Outlet at the Wastewater Treatment Facilities (WTF) 1

Area No.	PSC - Odour Generating Activity	Floor area m ²	Clear Head room m	Volume m ³	Air Exchange Rate per hour	Airflow Rate m ³ /s	Worst-case Measured Odour Concentration ou/m ³	Adjusted Odour Emission Rate ou/m ³	Odour Emission Rate ou/s	Average Odour Emission Rate after Scrubber Unit ou/s
6	WTF	191	4.5	860	15	3.6	100	100	358.1	17.9
						Total Airflow Rate, m ³ /s	3.6	Total Odour Emission	358.1	17.9
						Number of Exhaust Outlet	1	Odour Removal Efficiency of Scrubber Unit 95%		
						Airflow Rate of each Outlet, m ³ /s	3.6			
						Airflow Rate of each Outlet, m ³ /hr	12,892.5			
						Efflux velocity, m/s	15.6			
						Area of each Outlet, m ²	0.23			
						Radius of Exhaust Outlet, m	0.27			
						Diameter of Exhaust Outlet, m	0.54			

Calculations of Emission for the Exhaust Outlet at Poultry Slaughtering Centre (PSC) Stall 2

Area No.	PSC - Odour Generating Activity	Floor area m ²	Clear Head room m	Volume m ³	Air Exchange Rate per hour	Airflow Rate m ³ /s	Worst-case Measured Odour Concentration ou/m ³	Adjusted Odour Emission Rate ou/m ³	Odour Emission Rate ou/s	Average Odour Emission Rate after Scrubber Unit ou/s
1	Reception/Holding Area	224	3.5	784	12	2.6	396.7	384.8	1,005.6	50.3
2	Slaughtering Area	220	3.5	770	10	2.1	540.5	171.0	365.7	18.3
3	Evisceration Area	250	3.5	875	8	1.9	730.0	311.2	605.1	30.3
4	Packing Area	272	3.5	952	5	1.3	44.0	5.7	7.6	0.4
5	Waste Collection Area	40	3.5	140	15	0.6	604.0	604.0	352.3	17.6
						Total Airflow Rate, m ³ /s	4.2	Total Odour Emission	2,336.3	116.8
						Number of Exhaust Outlet	1	Odour Removal Efficiency of Scrubber Unit 95%		
						Airflow Rate of each Outlet, m ³ /s	4.2			
						Airflow Rate of each Outlet, m ³ /hr	15,108.0			
						Efflux velocity, m/s	15.9			
						Area of each Outlet, m ²	0.26			
						Radius of Exhaust Outlet, m	0.29			
						Diameter of Exhaust Outlet, m	0.58			

Notes

1. Required airflow rates of Areas 2 to 4 are calculated based on a fresh air rate of 10 L/person/second.
2. Actual fresh air intakes are calculated based on the required fresh air take.

Calculations of Emission for the Exhaust Outlet at the Wastewater Treatment Facilities (WTF) 2

Area No.	PSC - Odour Generating Activity	Floor area m ²	Clear Head room m	Volume m ³	Air Exchange Rate per hour	Airflow Rate m ³ /s	Worst-case Measured Odour Concentration ou/m ³	Adjusted Odour Emission Rate ou/m ³	Odour Emission Rate ou/s	Average Odour Emission Rate after Scrubber Unit ou/s
6	WTF	141	4.5	635	15	2.6	100	100	264.4	13.2
						Total Airflow Rate, m ³ /s	2.6	Total Odour Emission	264.4	13.2
						Number of Exhaust Outlet	1	Odour Removal Efficiency of Scrubber Unit 95%		
						Airflow Rate of each Outlet, m ³ /s	2.6			
						Airflow Rate of each Outlet, m ³ /hr	9,517.5			
						Efflux velocity, m/s	15.9			
						Area of each Outlet, m ²	0.17			
						Radius of Exhaust Outlet, m	0.23			
						Diameter of Exhaust Outlet, m	0.46			